

1 **A SYSTEM OF TWO-PANEL KEYBOARD**2 **FIELD OF INVENTION**

3 A system of two computer-keyboard panels for reducing injuries to shoulders and arms.

4 **BACKGROUND OF THE INVENTION**

5 The designs and applications of typewriter and computer keyboards of prior art do not
6 account for the ergonomics of the upper extremity based on the anatomy, physiology and
7 biomechanics of the shoulders and upper arms as they relate to a computer, laptop and hand-
8 held computers, cash registers and the like henceforth devices and the workstations. The
9 anatomy, physiology and biomechanics of the shoulders and upper arms heretofore had
10 neither been taken into account, known nor understood by the designers and manufacturers of
11 keyboards of prior art. Essentially, the contemporary keyboards being widely used today with
12 computers are vintage typewriter keyboards plus other accessories listed infra.

13 The modern-day keyboards as relate to the devices enhance the productivity of a computer
14 user who spent long hours each day maneuvering the structures of the shoulders and upper
15 extremities that are spatially positioned to the left and right of both ends of a computer
16 keyboard. Therefore, the shoulders and upper arms must move such as, but not limited to,
17 internal and external rotate, abduct and adduct in order to use and operate the a keyboard and
18 all other accessories such as computer mouse, dials, scrolling and pointing devices that are
19 clustered on said keyboard placed before the computer user's torso and also scattered to the
20 sides of said user's left and right shoulders and upper arms. Moreover, the shoulders and
21 arms are in poor postures due to the designs and placements of said equipments.

22 Consequently, harmful movements and poor postures of the shoulders and upper arms using
23 said equipments of prior art resulted in the stress, strain, sprain and injuries of the structural

1 components of the shoulders and upper arms. Said injuries are irreversible, chronic and
2 disabling for most computer users. These prevalent disorders and injuries of the were
3 observed by this physician applicant. Heretofore, there was no understanding and solution
4 were had. Billions of dollars are spent annually for the so-called ergonomics consultants,
5 worker trainings, equipment and workstations redesign, insurance premiums and
6 compensations. The costs escalate as the reliance on computers continues to increase.
7 However, the cost-effectiveness of these expenses cannot be realized as it was made obvious
8 supra.

9 The objectives of the present invention is to prevent and reduce the injuries of the shoulders
10 and upper extremities of the computer users and to reduce pain, suffering, and healthcare and
11 business costs.

12 SUMMARY OF THE INVENTION

13 The designs and applications of typewriter and computer keyboards of prior art do not
14 account for the ergonomics of the upper extremity based on the anatomy, physiology and
15 biomechanics of the shoulders and upper arms as they relate to a computer, laptop and
16 handheld computers and the like. Consequently, unnecessary movements and poor postures
17 of the shoulders and upper arms using said equipments of prior art resulted in the stress,
18 strain, sprain and injuries of the structural components of the shoulders and upper arms.

19 The present invention is a system comprises two separate panels of computer keyboard for
20 reducing the unnecessary motions and promoting the ergonomic posture of the hands,
21 forearms, elbows, upper arms and shoulders of a computer-keyboard user. The system
22 comprises a first independent keyboard panel comprises all keys bearing all numerics,
23 alphabets, words, symbols, signs and functions to the left of and including keys 5, T, G, B. A
24 second independent keyboard panel comprises all keys bearing all numerics, alphabets,
25 words, symbols, signs and functions to the right of and including keys 6, Y, H, N. A camera

1 and a support base comprises a mold for the hand-wrist-forearm and various types of sensors
2 are incorporated into each panel to minimize the unnecessary movements and effect the
3 ergonomic posture of the limb and shoulder.

4 **DIAGRAM OF PREFERRED EMBODIMENT**

5 Perspective view of the present invention.

6 **PREFERRED EMBODIMENTS OF THE INVENTION**

7 A device 1 is a system of two separate and independent panels of computer keyboard to
8 optimally maintain and promote the ergonomic postures and reducing the unnecessary
9 motions of the shoulders and upper arms of a computer user who uses a computer, laptop
10 computer, portable and compact computer and the like.

11 Said system comprises a first independent computer keyboard panel member 2 and a second
12 independent computer keyboard panel member 3 which are being used, operated by and
13 associated with the left upper extremity and right upper extremity of a computer user,
14 respectively. Each panel member comprises a chassis or a supporting base 4 that is made
15 from plastic and various man-made materials commonly used for manufacturing computer
16 keyboards, mouses, balls, buttons, scrolling wheels and the like of prior art.

17 Within a first chassis 4, the left independent keyboard panel member comprises all keyboard
18 keys universally found on computer keyboards bearing all the numerics, alphabets, words,
19 symbols, signs and functions to the left of keys 5, T, G, B such as, but not limited to, 4, R, F,
20 V, Esc, Cap Locks, Shift, Ctrl including keys 5, T, G, B and their specifically associated
21 symbols and functions 6. The first chassis 4 thence said contents can be indepedently

1 positioned, moved and maneuvered in different directions on any surface or surfaces
2 independent of a second chassis infra. Moreover, the front end of the keyboard keys has an
3 adjustable tilting set of keys 7 to facilitate the typing of said keys by the keying fingers. A
4 first Return-key 8 and a first Enter-key 9 are positioned to the sides of said keyboards. It is
5 understood that the front and back sides of said panel are defined as the side closest and
6 farthest from the computer monitor, respectively. Therefore, first Return-key 8 or first Enter-
7 key 9 is positioned in a plane connecting said front and back sides. In other words, using a
8 computer keyboard of prior art, said preferred embodiment is said first Return key will be to
9 the right of the V-key, i.e. approximately in the B-key position. Said first Enter-key will be to
10 the left of Q-key, i.e. approximately in the Tab-key position. It is emphasized that in said first
11 panel, the first Enter-key 8 is positioned forward of first Return-key 9 or a portion of said first
12 Enter-key is positioned forward of said first Return-key.

13 Similarly, with a second chassis 5, the right independent computer keyboard panel member 3
14 comprises all keyboard keys bearing all the numerics, alphabets, words, symbols, signs and
15 functions to the right of keys 6, Y, H, N universally found on computer keyboards such as,
16 but not limited to, 7, U, J, M, Backspace, Alt, Delete including keys 6, Y, H, N and their
17 specifically associated symbols and functions 10. In this part of the diagram, portion of the
18 keyboard is left untilted. The second chassis 5 can be independently positioned, moved and
19 maneuvered in different directions on any surface or surfaces independent of said first
20 chassis.

21 A second Return-key 11 and a second Enter-key 12 are positioned to the sides of said
22 keyboards 10. Based on above explanation, second Return-key 11 or second Enter-key 12 is
23 positioned in a plane connecting said front and back sides. In other words, using a computer
24 keyboard of prior art, said preferred embodiment is said second Return key will be to the left
25 N-key, i.e. approximately in the B-key position. Said second Enter-key will be to the right of
26 P-key, i.e. approximately in the { -key position. It is emphasized that in said second panel, the
27 said second Enter-key is positioned forward of said second Return-key or a portion of said

- 1 second Enter-key is positioned forward of said second Return-key.
- 2 In addition, each said panel member further comprises computer mouse 13, balls 14, buttons
3 15, wheels 16, dials, scrolling and pointing devices and a camera 17 means for monitoring
4 and scrutinizing the movements and postures of the ipsilateral shoulder and upper arm or
5 both shoulders and upper arms. The camera has adjustably swivelling lens or lenses adaptable
6 to serve the function of surveillance said structures of one or both limbs and feed the
7 information transmitted by wireless means or wired means to a computer to achieve the goal
8 of the present invention.
- 9 Other components and features that are commonly used and applied in the manufacturing of
10 the supports and tractions of the common computer keyboards and mouses are incooperated
11 into said panel members. For example, each panel has a traction means for reversibly affixing
12 said panel in a position on the surface of a workstation 18 so that the panel does not move as
13 the computer user's arm is operating said panel. Such traction means can be a plurality of
14 rubber, gel or hooks-loops (VELCRO) pieces which are attached and/or glued to the
15 undersurface of said panel and surfaces of workstations. More traction force for affixing can
16 be achieved, for example, by rubberizing a large portion of the undersurface of the panel. In
17 addition, said components and features are applied for all the structures supra.
- 18 By its virtue alone, the left keyboard panel and the right keyboard panel of the present
19 invention can achieved the goal of the present invention. Each keyboard panel is able to
20 position the respective shoulder and upper arm in the ergonomic posture and to minimize, if
21 not altogether eliminate, the frequent and unnecessary internal and external rotations,
22 adductions, abductions, compression, impingement and combination thereof of the upper
23 arm, shoulder and associated structures such as muscles, tendons, bursae, ligaments, muscles
24 and bones. In other words, said panel can be independently moved and positioned by the
25 respective hand and forearm into a position whereby a specific desirable flexion angle at the
26 elbow between the forearm and the upper arm is achieved and maintained. Consequently,

1 said effect results in the ergonomic posture of the ipsilateral shoulder and upper arm. The
2 optimal condition is achieved wherein the ipsilateral hand, forearm, elbow, upper arm and
3 shoulder are comfortably positioned and only the fingers and the muscles in the forearm are
4 performing the typing of the keys. Thus, the goal of the present invention is achieved.

5 However, artificial intelligence is incorporated into the system of the present invention to
6 compensate for human variabilites. Therefore, first, attached to or incorporated into said
7 panel is a hand-wrist-forearm support base 19 on which a hand-wrist-forearm complex
8 (HWFA) of an upper extremity of a computer operator using said panel can engage and rest.
9 A preferred embodiment is said support base comprises a cast or a mold 20 of an average or
10 typical HWFA or it can be a mold or die of varying sizes of HWFA. To help understanding
11 the concept of the present invention, a HWFA fitting said mold functions like a stylus of and
12 the lower and upper arm function like the arms of a phonograph or a seismograph. In other
13 words, in practice, said support base, mold and HWFA control and effect a flexion angle
14 between the forearm and the upper arm at the elbow. In turn, specific desirable flexion angle
15 at the elbow controls the position of the ipsilateral shoulder and upper arm and effects an
16 ergonomic posture of said shoulder and upper arm. Said effects become obvious infra.

17 Components and features that are commonly used and applied in the manufacturing of the
18 computers, supports and furnitures are used to make said support base. Materials include
19 various types of plastics, vinyls and other synthetics of practicality and comfort.

20 Second, the hand-wrist-forearm support base comprises a contact-sensor means for
21 monitoring the positions, orientations of and contacts between the hand, wrist and forearm
22 and the contact-sensor means 21. By said very shape of the HWFA-mold, a plurality of
23 pressure-sensitive sensors can be strategically incorporated into the mold. Each sensor has the
24 ability to detect and monitor a range of pressure being exerted on said support base and/or
25 said sensor. For example, two sensors 22 can be incorporated in the hand part, two sensors
26 can be incorporated in the wrist part (not shown) and two sensors 21 are incorporated in the

1 forearm part of said HWFA-mold.

2 Furthermore, the hand-wrist-forearm support base comprises a temperature-sensor means for
3 detecting and monitoring the positions, orientations of and contacts between the hand, wrist
4 and forearm 23. The temperaturue-sensor detects and monitor the heat emitted by the hand,
5 wrist and forearm of said HWFA. Each sensor has the ability to detect and monitor a range
6 of heat or lack thereof being exerted on said support base and/or said sensor. Similarly, as
7 described supra, by said very shape of said mold, a plurality of temperature-sensitive sensors
8 can be strategically incorporated into said mold to achieve their functions. For example, two
9 sensors can be incorporated in the hand part, two sensors can be incorporated in the wrist part
10 and two sensors are incorporated in the forearm part of said mold. In place of temperature
11 sensors or incorporate with said sensors, a plurality of acoustic generating devices and
12 acoustic detecting sensor or monitor (sonar) - not shown - can be strategically incorporated
13 into the mold to achieve said function and purpose.

14 The sensitivity of each sensor member in different categories or combination of categories of
15 sensors can be adjusted to achieve the goal of the present invention - the ergonomic and least
16 stressed condition of the shoulder and upper arm. For example, the sensitivity of each sensor
17 member can be tuned or adjusted to be more or less sensitive than that of othe sensor
18 members in different location of said mold. Consequently, said HWFA is positioned in a
19 specific attitude in said mold as demanded by said finely tuned sensors in order to comply
20 with the computer programs collecting data from and feedbacking to and operating said
21 sensors. As explained using the phonograph as example, the result is a desired flexion angle
22 between the forearm and upper arm at the elbow. In turn, as described supra, specific said
23 flexion angle controls and effects the reduction or elimination of the unneccessary motions of
24 and the promotion or achievement of the ergonomic posture of the ipsilateral shoulder and
25 upper arm.

26 Similarly, said hand-wrist-forearm support base and said sensors are able to compel said

1 desired results. Using a specific type of said sensors or a combination of different types of
2 said sensors, the support base can be used together with at least a computer program to
3 compel the HWFA to be positioned, oriented and maintained in a specific desired position or
4 ergonomic posture and attitude of the hand, wrist, forearm, upper arm and shoulder. Said
5 sensors can operate with an on-off switch means for intelligently turning on and off the
6 function of said panel. Furthermore, a timing device for permitting a certain period of
7 disengagement and/or engagement of HWFA with said mold, support base and keyboard
8 panel. In other words, a timing device is incorporated into said panel, support base and mold.
9 Said timing device is programed to permit a certain period of disengagement of the HWFA
10 from the panel or support base before the system informs the computer operator of the
11 disruption of the engagement between said HWFA and said sensors. Various outcomes and
12 actions to be taken are programmed into the computer. Two of the consequences are visually
13 and/or auditory informing the computer operator to comply with said ergonomic requirement
14 or, ultimately, the performance of the panel and computer is disrupted or temporarily
15 terminated. On the other hand, said timing device also permits a certain period of
16 engagement of said HWFA with said panel and/or support base before the system informs
17 and permits the computer operator to take a break. Said achievements are also assisted by
18 said camera and its softwares.

19 A computer software means for collecting, computing and analyzing the information and data
20 on the movements, positions, orientations, postures and degrees of stress on the hands, wrists,
21 arms and shoulders generated by said panels, cameras, support bases and sensors can be used
22 to inform the operator on the positions and postures of said limbs and shoulders by visual or
23 auditory means and combination thereof.

24 In laptop and portable computers - not shown in the diagram - in place of the keyboards of
25 prior art, a housing is used to compact and store said left and right panels and support base. A
26 retracting, swivelling and/or hinge means for positioning, moving and maneuvering in
27 different directions said panels are used to compact and expand said panels within and

1 beyond, respectively, the body of said computers. As described supra, a base supporting
2 means for variably affixing a position of said panel and a traction means for adjustably
3 affixing a position of said panel are incorporated.

4 Although the preferred embodiments have been described, it will be appreciated by those
5 skilled in art that variations, adaptations, configurations and geometries of the present
6 invention can be had without departing from the spirit of the invention and the scope of the
7 claims.

8 Although the preferred embodiments have been identified and described said equipments and
9 computers, it will be appreciated by those skilled in art that the present invention including
10 its variations and adaptations can be used and applied to other equipments, devices and
11 computers which were not described or identified without departing from the spirit of the
12 invention and the scope of the claims.